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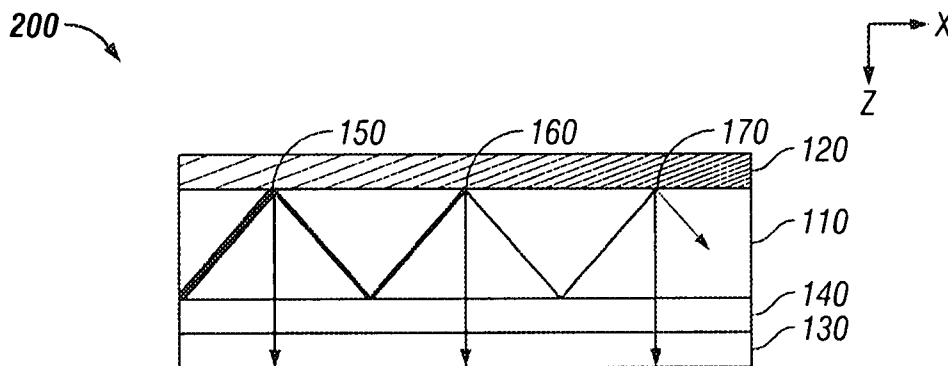
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**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: DISPLAY DEVICE WITH DIFFRACTIVE OPTICS



(57) Abstract: Light modulator displays may be illuminated using a light guide comprising diffractive optics that directs light onto an array of light modulators. A holographic light turning element may be included with the light guide to turn light propagating within the light guide onto the light modulators. In some embodiments, the holographic element is configured to distribute a substantially uniform amount of light across the array of modulators. The holographic element may, for example, have a turning efficiency that changes along the length of the holographic element. A holographic element can also be used to function as a light bar. Such a holographic element may receive light from a light source such as a light emitting diode and distribute the light along a light guide disposed in front of an array of light modulators.

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# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G02B6/00 F21V8/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2006/126142 A1 (CHOI JIN-SEUNG [KR]) 15 June 2006 (2006-06-15)  the whole document	1-11, 14-32, 35-41 12,13, 33,34
X A	US 2004/246743 A1 (LEE MOON-GYU [KR] ET AL LEE MOON-GYU [KR] ET AL) 9 December 2004 (2004-12-09) paragraph [0087]; figure 7  paragraphs [0097] - [0100]; figure 10A	1-11, 14-32, 35-41 12,13, 33,34
X A	US 5 515 184 A (CAULFIELD H JOHN [US] ET AL) 7 May 1996 (1996-05-07)  abstract; figure 4	1-11, 14-32, 35-41 12,13, 33,34
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Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
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- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

11 April 2008

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22/10/2008

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 260 203 A (MARCONI GEC LTD [GB]) 7 April 1993 (1993-04-07)	1-11, 14-32, 35-41
A	page 4; figure 2	12,13, 33,34
P,X	EP 1 734 401 A (SAMSUNG ELECTRO MECH [KR]) 20 December 2006 (2006-12-20)  paragraphs [0005], [0008] figures 3,4	1-11, 14-32, 35-41

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/021622

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-41

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-41

An illumination apparatus comprising a light guide and a hologram configured to turn a portion of the light propagating within the light guide out of the light guide, wherein the turning efficiency varies across the light guide.

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2. claims: 42-74

An illumination apparatus comprising a light guide and a hologram configured to redirect a portion of the light propagating within the light guide.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/021622

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2006126142	A1	15-06-2006	KR 20060066974 A	19-06-2006
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US 5515184	A	07-05-1996	NONE	
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